

Surface Water Drainage Calculations

For a site referred to as

Manchester Communication Academy,
Year 7

Undertaken on behalf of

Lancaster Maloney Martin Ltd.

WML Job No: 11258

Document No: 11258-WML-Y7-XX-CA-C-0001

Date: March 2025

Project No. & Name:	11258 – MCA – Year 7	Status:	Prepared by:	Rev:	Date:
Document Ref:	11258-WML-Y7-XX-CA-C-0001	Preliminary	Daniel Baker	P02	March 2025

General Notes

1. The calculations within this document have been undertaken using MicroDrainage Software version 2020.
2. This document is to be read in conjunction with the following documents;
 - a. 11258-WML-Y7-XX-DR-C-2001 – Proposed Drainage GA

Summary of Results

1. The following summary demonstrates that the outgoing flow rates for the new development works are less than or equal to the existing greenfield runoff rate.

Greenfield Runoff Rate (l/s)*	Proposed Site Runoff Rate – Manhole S7 (l/s)
1: 2.0	1: 1.8
30: 3.4	30: 3.0
100+45%: 3.7	100+45%: 3.6

*An urban factor of 0.75 has been applied to the existing greenfield runoff rate to account for the extent of existing impermeable hardstanding.

Existing Greenfield Runoff Rates

WML Consulting Ltd		Page 1
No. 8 Oak Green Stanley Green Business Park Earl Rd, Cheadle Hulme, SK8 6QL		
Date 21/03/2024 11:04 File	Designed by DBaker Checked by	
Innovyze		Source Control 2020.1.3
ICP SUDS Mean Annual Flood Input Return Period (years)1Soil0.450 Area (ha) 0.167Urban0.750 SAAR (mm)864Region NumberRegion 10 Results1/s QBAR Rural0.9 QBAR Urban2.3 Q1 year2.0 Q1 year2.0 Q30 years3.4 Q100 years3.7		
©1982-2020 Innovyze		

Proposed Surface Water Network Calculation

WML Consulting Ltd

No. 8 Oak Green
Stanley Green Business Park
Earl Rd, Cheadle Hulme, SK8 6QL

Date 31/03/2025 15:20
File 11258 - Surface Water 0...

Innovyze

Designed by DBaker
Checked by

Network 2020.1.3

Page 1



STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)

1

PIMP (%)

100

M5-60 (mm)

18.000

Add Flow / Climate Change (%)

0

Ratio R

0.360

Minimum Backdrop Height (m)

0.200

Maximum Rainfall (mm/hr)

50

Maximum Backdrop Height (m)

1.500

Maximum Time of Concentration (mins)

30

Min Design Depth for Optimisation (m)

1.200

Foul Sewage (l/s/ha)

0.000

Min Vel for Auto Design only (m/s)

1.00

Volumetric Runoff Coeff.

0.750

Min Slope for Optimisation (1:X)

500

Designed with Level Soffits

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.000	45.000	0.450	100.0	0.018	5.00	0.0	0.600	o	225	Pipe/Conduit	
S1.001	40.000	0.400	100.0	0.054	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.002	27.500	0.275	100.0	0.023	0.00	0.0	0.600	o	225	Pipe/Conduit	
S2.000	18.000	0.200	90.0	0.018	5.00	0.0	0.600	o	225	Pipe/Conduit	
S2.001	19.500	0.200	97.5	0.011	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.003	2.475	0.025	99.0	0.012	0.00	0.0	0.600	o	225	Pipe/Conduit	
S3.000	1.500	0.000	0.0	0.000	5.00	0.0	0.600	o	300	Pipe/Conduit	
S1.004	14.620	0.530	27.6	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	E I.Area (ha)	E Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.000	44.67	5.57	64.000	0.018	0.0	0.0	0.0	1.31	52.0	2.1
S1.001	42.96	6.08	63.550	0.072	0.0	0.0	0.0	1.31	52.0	8.3
S1.002	41.86	6.43	63.150	0.095	0.0	0.0	0.0	1.31	52.0	10.8
S2.000	45.97	5.22	64.000	0.018	0.0	0.0	0.0	1.38	54.8	2.2
S2.001	45.06	5.46	63.800	0.029	0.0	0.0	0.0	1.32	52.7	3.5
S1.003	41.77	6.47	62.875	0.136	0.0	0.0	0.0	1.31	52.2	15.4
S3.000	46.16	5.17	62.050	0.000	0.0	0.0	0.0	0.15	10.5	0.0
S1.004	41.39	6.59	62.050	0.136	0.0	0.0	0.0	1.92	34.0	15.4

©1982-2020 Innovyze

WML Consulting Ltd		Page 2
No. 8 Oak Green Stanley Green Business Park Earl Rd, Cheadle Hulme, SK8 6QL		
Date 31/03/2025 15:20	Designed by DBaker	
File 11258 - Surface Water 0...	Checked by	
Innovyze		Network 2020.1.3

Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
S1	64.775	0.775	Open Manhole	600	S1.000	64.000	225				
S2	64.765	1.215	Open Manhole	600	S1.001	63.550	225	S1.000	63.550	225	
S3	64.765	1.615	Open Manhole	600	S1.002	63.150	225	S1.001	63.150	225	
S4	64.765	0.765	Open Manhole	600	S2.000	64.000	225				
S5	64.770	0.970	Open Manhole	600	S2.001	63.800	225	S2.000	63.800	225	
S6	64.770	1.895	Open Manhole	600	S1.003	62.875	225	S1.002	62.875	225	
								S2.001	63.600	225	725
S-TANK	64.550	2.500	Junction		S3.000	62.050	300				
S7	64.700	2.650	Open Manhole	1350	S1.004	62.050	150	S1.003	62.850	225	875
								S3.000	62.050	300	
S	64.350	2.830	Open Manhole	0		OUTFALL		S1.004	61.520	150	

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S1	385929.159	400865.593	385929.159	400865.593	Required	
S2	385962.636	400895.664	385962.636	400895.664	Required	
S3	385989.366	400865.906	385989.366	400865.906	Required	
S4	385942.516	400849.974	385942.516	400849.974	Required	
S5	385955.907	400862.003	385955.907	400862.003	Required	
S6	385968.938	400847.496	385968.938	400847.496	Required	
S-TANK	385971.594	400844.539			No Entry	
S7	385970.592	400845.655	385970.592	400845.655	Required	
S	385959.715	400835.885			No Entry	

WML Consulting Ltd		Page 3
No. 8 Oak Green Stanley Green Business Park Earl Rd, Cheadle Hulme, SK8 6QL		
Date 31/03/2025 15:20 File 11258 - Surface Water 0...	Designed by DBaker Checked by	
Innovyze		Network 2020.1.3

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	o	225	S1	64.775	64.000	0.550	Open Manhole	600
S1.001	o	225	S2	64.765	63.550	0.990	Open Manhole	600
S1.002	o	225	S3	64.765	63.150	1.390	Open Manhole	600
S2.000	o	225	S4	64.765	64.000	0.540	Open Manhole	600
S2.001	o	225	S5	64.770	63.800	0.745	Open Manhole	600
S1.003	o	225	S6	64.770	62.875	1.670	Open Manhole	600
S3.000	o	300	S-TANK	64.550	62.050	2.200	Junction	
S1.004	o	150	S7	64.700	62.050	2.500	Open Manhole	1350

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	45.000	100.0	S2	64.765	63.550	0.990	Open Manhole	600
S1.001	40.000	100.0	S3	64.765	63.150	1.390	Open Manhole	600
S1.002	27.500	100.0	S6	64.770	62.875	1.670	Open Manhole	600
S2.000	18.000	90.0	S5	64.770	63.800	0.745	Open Manhole	600
S2.001	19.500	97.5	S6	64.770	63.600	0.945	Open Manhole	600
S1.003	2.475	99.0	S7	64.700	62.850	1.625	Open Manhole	1350
S3.000	1.500	0.0	S7	64.700	62.050	2.350	Open Manhole	1350
S1.004	14.620	27.6	S	64.350	61.520	2.680	Open Manhole	0

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S1.004	S	64.350	61.520	0.000	0	0

WML Consulting Ltd		Page 4
No. 8 Oak Green Stanley Green Business Park Earl Rd, Cheadle Hulme, SK8 6QL		
Date 31/03/2025 15:20 File 11258 - Surface Water 0...		
Designed by DBaker Checked by		
Innovyze		Network 2020.1.3

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start (mins)	0	Inlet Coefficient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Storage Structures	1
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	1	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.000	Storm Duration (mins)	30
Ratio R	0.360		

©1982-2020 Innovyze

WML Consulting Ltd		Page 5
No. 8 Oak Green Stanley Green Business Park Earl Rd, Cheadle Hulme, SK8 6QL		
Date 31/03/2025 15:20 File 11258 - Surface Water 0...		
Designed by DBaker Checked by		
Innovyze		Network 2020.1.3

Online Controls for Storm

Hydro-Brake® Optimum Manhole: S7, DS/PN: S1.004, Volume (m³): 3.9

Unit Reference	MD-SCU-0069-5000-1000-5000
Design Head (m)	1.000
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Linear discharge profile
Application	Surface
Sump Available	Yes
Diameter (mm)	69
Invert Level (m)	62.050
Minimum Outlet Pipe Diameter (mm)	100
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	5.0
Flush-Flo™	0.092	1.8
Kick-Flo®	0.104	1.8
Mean Flow over Head Range	-	3.4

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	1.8	1.200	5.4	3.000	8.4	7.000	12.6
0.200	2.4	1.400	5.9	3.500	9.0	7.500	13.0
0.300	2.9	1.600	6.2	4.000	9.6	8.000	13.4
0.400	3.3	1.800	6.6	4.500	10.2	8.500	13.8
0.500	3.6	2.000	6.9	5.000	10.7	9.000	14.2
0.600	3.9	2.200	7.2	5.500	11.2	9.500	14.6
0.800	4.5	2.400	7.5	6.000	11.7		
1.000	5.0	2.600	7.8	6.500	12.1		

©1982-2020 Innovyze

WML Consulting Ltd		Page 6																																																																																				
No. 8 Oak Green Stanley Green Business Park Earl Rd, Cheadle Hulme, SK8 6QL																																																																																						
Date 31/03/2025 15:20 File 11258 - Surface Water 0...	Designed by DBaker Checked by																																																																																					
Innovyze Network 2020.1.3																																																																																						
<u>Storage Structures for Storm</u>																																																																																						
<u>Cellular Storage Manhole: S-TANK, DS/PN: S3.000</u>																																																																																						
Invert Level (m) 62.050 Safety Factor 2.0 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95 Infiltration Coefficient Side (m/hr) 0.00000																																																																																						
<table border="1"> <thead> <tr> <th>Depth (m)</th> <th>Area (m²)</th> <th>Inf. Area (m²)</th> <th>Depth (m)</th> <th>Area (m²)</th> <th>Inf. Area (m²)</th> </tr> </thead> <tbody> <tr><td>0.000</td><td>125.0</td><td>125.0</td><td>2.600</td><td>0.0</td><td>165.2</td></tr> <tr><td>0.200</td><td>125.0</td><td>133.9</td><td>2.800</td><td>0.0</td><td>165.2</td></tr> <tr><td>0.400</td><td>125.0</td><td>142.9</td><td>3.000</td><td>0.0</td><td>165.2</td></tr> <tr><td>0.600</td><td>125.0</td><td>151.8</td><td>3.200</td><td>0.0</td><td>165.2</td></tr> <tr><td>0.800</td><td>125.0</td><td>160.8</td><td>3.400</td><td>0.0</td><td>165.2</td></tr> <tr><td>1.000</td><td>0.0</td><td>165.2</td><td>3.600</td><td>0.0</td><td>165.2</td></tr> <tr><td>1.200</td><td>0.0</td><td>165.2</td><td>3.800</td><td>0.0</td><td>165.2</td></tr> <tr><td>1.400</td><td>0.0</td><td>165.2</td><td>4.000</td><td>0.0</td><td>165.2</td></tr> <tr><td>1.600</td><td>0.0</td><td>165.2</td><td>4.200</td><td>0.0</td><td>165.2</td></tr> <tr><td>1.800</td><td>0.0</td><td>165.2</td><td>4.400</td><td>0.0</td><td>165.2</td></tr> <tr><td>2.000</td><td>0.0</td><td>165.2</td><td>4.600</td><td>0.0</td><td>165.2</td></tr> <tr><td>2.200</td><td>0.0</td><td>165.2</td><td>4.800</td><td>0.0</td><td>165.2</td></tr> <tr><td>2.400</td><td>0.0</td><td>165.2</td><td>5.000</td><td>0.0</td><td>165.2</td></tr> </tbody> </table>			Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)	0.000	125.0	125.0	2.600	0.0	165.2	0.200	125.0	133.9	2.800	0.0	165.2	0.400	125.0	142.9	3.000	0.0	165.2	0.600	125.0	151.8	3.200	0.0	165.2	0.800	125.0	160.8	3.400	0.0	165.2	1.000	0.0	165.2	3.600	0.0	165.2	1.200	0.0	165.2	3.800	0.0	165.2	1.400	0.0	165.2	4.000	0.0	165.2	1.600	0.0	165.2	4.200	0.0	165.2	1.800	0.0	165.2	4.400	0.0	165.2	2.000	0.0	165.2	4.600	0.0	165.2	2.200	0.0	165.2	4.800	0.0	165.2	2.400	0.0	165.2	5.000	0.0	165.2
Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)																																																																																	
0.000	125.0	125.0	2.600	0.0	165.2																																																																																	
0.200	125.0	133.9	2.800	0.0	165.2																																																																																	
0.400	125.0	142.9	3.000	0.0	165.2																																																																																	
0.600	125.0	151.8	3.200	0.0	165.2																																																																																	
0.800	125.0	160.8	3.400	0.0	165.2																																																																																	
1.000	0.0	165.2	3.600	0.0	165.2																																																																																	
1.200	0.0	165.2	3.800	0.0	165.2																																																																																	
1.400	0.0	165.2	4.000	0.0	165.2																																																																																	
1.600	0.0	165.2	4.200	0.0	165.2																																																																																	
1.800	0.0	165.2	4.400	0.0	165.2																																																																																	
2.000	0.0	165.2	4.600	0.0	165.2																																																																																	
2.200	0.0	165.2	4.800	0.0	165.2																																																																																	
2.400	0.0	165.2	5.000	0.0	165.2																																																																																	
©1982-2020 Innovyze																																																																																						

WML Consulting Ltd

Page 7

No. 8 Oak Green

Stanley Green Business Park

Earl Rd, Cheadle Hulme, SK8 6QL

Date 31/03/2025 15:20

File 11258 - Surface Water 0...

Designed by DBaker

Checked by

Innovyze

Network 2020.1.3

Micro Drainage

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1)

for Storm

Simulation Criteria

Areal Reduction Factor 1.000

Additional Flow - % of Total Flow 0.000

Hot Start (mins) 0

MADD Factor * 10m³/ha Storage 2.000

Hot Start Level (mm) 0

Inlet Coefficient 0.800

Manhole Headloss Coeff (Global) 0.500

Flow per Person per Day (l/per/day) 0.000

Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0

Number of Storage Structures 1

Number of Online Controls 1

Number of Time/Area Diagrams 0

Number of Offline Controls 0

Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR

Ratio R 0.360

Region England and Wales Cv (Summer) 0.750

M5-60 (mm) 18.000 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0

Analysis Timestep 2.5 Second Increment (Extended)

DTS Status OFF

DVD Status ON

Inertia Status ON

Profile(s) Summer and Winter

Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440

Return Period(s) (years) 1, 30, 100

Climate Change (%) 0, 0, 45

Water

PNUS/MHStormReturn PeriodClimate ChangeFirst (X) SurgeFirst (Y) FloodFirst (Z) OverflowOverflow Act.Overflow Level (m)

S1.000S115 Winter1+0%64.030

S1.001S215 Winter1+0%100/15 Winter63.609

S1.002S315 Winter1+0%100/15 Summer63.219

S2.000S415 Winter1+0%64.030

S2.001S515 Winter1+0%63.839

S1.003S615 Winter1+0%30/15 Summer62.984

S3.000S-TANK180 Winter1+0%100/30 Summer62.129

S1.004S715 Winter1+0%30/15 Summer62.151

Surcharged FloodedHalf Drain Pipe

PNUS/MHDepthVolumeFlow / OverflowTimeFlowLevel

PNUS/MHName(m)(m³)Cap.(l/s)(mins)(l/s)StatusExceeded

S1.000S1-0.1950.0000.042.1OK

S1.001S2-0.1660.0000.157.5OK

S1.002S3-0.1560.0000.209.8OK

S2.000S4-0.1950.0000.042.1OK

©1982-2020 Innovyze

WML Consulting Ltd

Page 9

No. 8 Oak Green

Stanley Green Business Park

Earl Rd, Cheadle Hulme, SK8 6QL

Date 31/03/2025 15:20

File 11258 - Surface Water 0...

Designed by DBaker

Checked by

Innovyze

Network 2020.1.3

Micro Drainage

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)

for Storm

Simulation Criteria

Areal Reduction Factor 1.000

Additional Flow - % of Total Flow 0.000

Hot Start (mins) 0

MADD Factor * 10m³/ha Storage 2.000

Hot Start Level (mm) 0

Inlet Coeffiecient 0.800

Manhole Headloss Coeff (Global) 0.500

Flow per Person per Day (l/per/day) 0.000

Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0

Number of Storage Structures 1

Number of Online Controls 1

Number of Time/Area Diagrams 0

Number of Offline Controls 0

Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR

Ratio R 0.360

Region England and Wales Cv (Summer) 0.750

M5-60 (mm) 18.000 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0

Analysis Timestep 2.5 Second Increment (Extended)

DTS Status OFF

DVD Status ON

Inertia Status ON

Profile(s) Summer and Winter

Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440

Return Period(s) (years) 1, 30, 100

Climate Change (%) 0, 0, 45

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	S1	15 Winter	30	+0%					64.049
S1.001	S2	15 Winter	30	+0%	100/15 Winter				63.656
S1.002	S3	15 Winter	30	+0%	100/15 Summer				63.276
S2.000	S4	15 Winter	30	+0%					64.049
S2.001	S5	15 Winter	30	+0%					63.865
S1.003	S6	15 Winter	30	+0%	30/15 Summer				63.151
S3.000	S-TANK	180 Winter	30	+0%	100/30 Summer				62.274
S1.004	S7	15 Winter	30	+0%	30/15 Summer				62.426

PN	US/MH Name	Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S1	-0.176	0.000	0.10			5.1	OK	
S1.001	S2	-0.119	0.000	0.43			21.4	OK	
S1.002	S3	-0.099	0.000	0.59			28.3	OK	
S2.000	S4	-0.176	0.000	0.11			5.2	OK	

©1982-2020 Innovyze

WML Consulting Ltd

Page 11

No. 8 Oak Green
Stanley Green Business Park
Earl Rd, Cheadle Hulme, SK8 6QL

Date 31/03/2025 15:20
File 11258 - Surface Water 0...

Innovyze

Designed by DBaker
Checked by

Network 2020.1.3



100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor 1.000

Additional Flow - % of Total Flow 0.000

Hot Start (mins) 0

MADD Factor * 10m³/ha Storage 2.000

Hot Start Level (mm) 0

Inlet Coefficient 0.800

Manhole Headloss Coeff (Global) 0.500

Flow per Person per Day (l/per/day) 0.000

Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0

Number of Storage Structures 1

Number of Online Controls 1

Number of Time/Area Diagrams 0

Number of Offline Controls 0

Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR

Ratio R 0.360

Region England and Wales Cv (Summer) 0.750

M5-60 (mm) 18.000 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0

Analysis Timestep 2.5 Second Increment (Extended)

DTS Status OFF

DVD Status ON

Inertia Status ON

Profile(s) Summer and Winter

Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440

Return Period(s) (years) 1, 30, 100

Climate Change (%) 0, 0, 45

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	S1	15 Winter	100	+45%					64.068
S1.001	S2	15 Winter	100	+45%	100/15 Winter				63.789
S1.002	S3	15 Winter	100	+45%	100/15 Summer				63.572
S2.000	S4	15 Winter	100	+45%					64.068
S2.001	S5	15 Winter	100	+45%					63.891
S1.003	S6	15 Winter	100	+45%	30/15 Summer				63.308
S3.000	S-TANK	240 Winter	100	+45%	100/30 Summer				62.528
S1.004	S7	240 Winter	100	+45%	30/15 Summer				62.545

PN	US/MH Name	Depth (m)	Surcharged Volume (m³)	Flooded Flow / Cap. (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S1	-0.157	0.000	0.19		9.6	OK	
S1.001	S2	0.014	0.000	0.75		37.0	SURCHARGED	
S1.002	S3	0.197	0.000	0.99		47.8	SURCHARGED	
S2.000	S4	-0.157	0.000	0.20		9.8	OK	

©1982-2020 Innovyze

Exceedance Storm Simulations

WML Consulting Ltd						Page 1			
No. 8 Oak Green Stanley Green Business Park Earl Rd, Cheadle Hulme, SK8 6QL									
Date 31/03/2025 15:28		Designed by DBaker							
File 11258 - Surface Water 0...		Checked by							
Innovyze				Network 2020.1.3					
<u>200 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm</u>									
Simulation Criteria									
Areal Reduction Factor		1.000		Additional Flow - % of Total Flow		0.000			
Hot Start (mins)		0		MADD Factor * 10m³/ha Storage		2.000			
Hot Start Level (mm)		0		Inlet Coeffiecient		0.800			
Manhole Headloss Coeff (Global)		0.500		Flow per Person per Day (l/per/day)		0.000			
Foul Sewage per hectare (l/s)		0.000							
Number of Input Hydrographs				0		Number of Storage Structures		1	
Number of Online Controls				1		Number of Time/Area Diagrams		0	
Number of Offline Controls				0		Number of Real Time Controls		0	
<u>Synthetic Rainfall Details</u>									
Rainfall Model		FSR		Ratio R		0.360			
Region England and Wales		Cv (Summer)		0.750					
M5-60 (mm)		18.000		Cv (Winter)		0.840			
Margin for Flood Risk Warning (mm)				300.0					
Analysis Timestep				2.5 Second Increment (Extended)					
DTS Status				OFF					
DVD Status				ON					
Inertia Status				ON					
Profile(s)				Summer and Winter					
Duration(s) (mins)		15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440							
Return Period(s) (years)		200, 500, 1000							
Climate Change (%)		0, 0, 0							
PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	
S1.000	S1	15 Winter	200	+0%					
S1.001	S2	15 Winter	200	+0%	1000/15 Summer				
S1.002	S3	15 Winter	200	+0%	200/15 Summer				
S2.000	S4	15 Winter	200	+0%					
S2.001	S5	15 Winter	200	+0%					
S1.003	S6	15 Winter	200	+0%	200/15 Summer				
S3.000	S-TANK	180 Winter	200	+0%	200/60 Winter				
S1.004	S7	180 Winter	200	+0%	200/15 Summer				
PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap. (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	
S1.000	S1	64.060	-0.165	0.000	0.15		7.6	OK	
S1.001	S2	63.685	-0.090	0.000	0.65		32.0	OK	
S1.002	S3	63.428	0.053	0.000	0.84		40.5	SURCHARGED	
S2.000	S4	64.060	-0.165	0.000	0.16		7.8	OK	
©1982-2020 Innovyze									

WML Consulting Ltd

Page 3

No. 8 Oak Green
Stanley Green Business Park
Earl Rd, Cheadle Hulme, SK8 6QL

Date 31/03/2025 15:28
File 11258 - Surface Water 0...

Innovyze

Designed by DBaker
Checked by

Network 2020.1.3

Micro Drainage

500 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor 1.000

Additional Flow - % of Total Flow 0.000

Hot Start (mins) 0

MADD Factor * 10m³/ha Storage 2.000

Hot Start Level (mm) 0

Inlet Coefficient 0.800

Manhole Headloss Coeff (Global) 0.500

Flow per Person per Day (l/per/day) 0.000

Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0

Number of Storage Structures 1

Number of Online Controls 1

Number of Time/Area Diagrams 0

Number of Offline Controls 0

Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR

Ratio R 0.360

Region England and Wales Cv (Summer) 0.750

M5-60 (mm) 18.000 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0

Analysis Timestep 2.5 Second Increment (Extended)

DTS Status OFF

DVD Status ON

Inertia Status ON

Profile(s) Summer and Winter

Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440

Return Period(s) (years) 200, 500, 1000

Climate Change (%) 0, 0, 0

US/MH

PN

Name

Storm

Return Period

Climate Change

First (X) Surge

First (Y) Flood

First (Z) Overflow

Overflow Act.

S1.000

S1

15 Winter

500

+0%

S1.001

S2

15 Winter

500

+0%

1000/15 Summer

S1.002

S3

15 Winter

500

+0%

200/15 Summer

S2.000

S4

15 Winter

500

+0%

S2.001

S5

15 Winter

500

+0%

S1.003

S6

15 Winter

500

+0%

200/15 Summer

S3.000

S-TANK

180 Winter

500

+0%

200/60 Winter

S1.004

S7

180 Winter

500

+0%

200/15 Summer

Water

US/MH

Level

Surcharged

Flooded

Flow / Overflow

Half Drain

Pipe

PN

Name

(m)

Depth

Volume

Cap.

(l/s)

(mins)

Flow

Status

S1.000

S1

64.067

-0.158

0.000

0.19

9.3

OK

S1.001

S2

63.762

-0.013

0.000

0.75

36.8

OK

S1.002

S3

63.554

0.179

0.000

0.97

47.0

SURCHARGED

S2.000

S4

64.067

-0.158

0.000

0.19

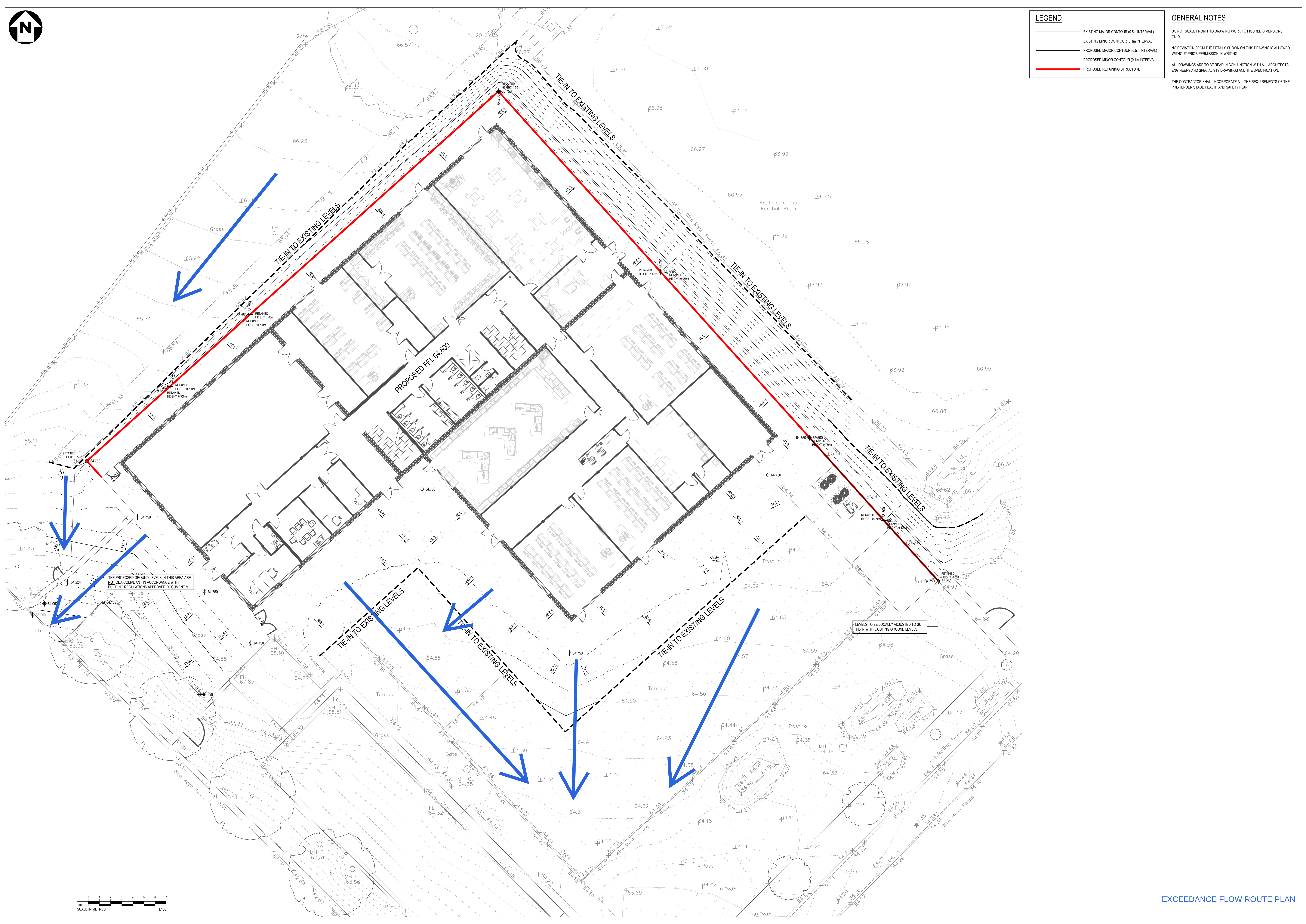
9.5

OK

©1982-2020 Innovyze

WML Consulting Ltd						Page 5			
No. 8 Oak Green Stanley Green Business Park Earl Rd, Cheadle Hulme, SK8 6QL									
Date 31/03/2025 15:28		Designed by DBaker							
File 11258 - Surface Water 0...		Checked by							
Innovyze				Network 2020.1.3					
<u>1000 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm</u>									
Simulation Criteria									
Areal Reduction Factor		1.000		Additional Flow - % of Total Flow		0.000			
Hot Start (mins)		0		MADD Factor * 10m³/ha Storage		2.000			
Hot Start Level (mm)		0		Inlet Coeffiecient		0.800			
Manhole Headloss Coeff (Global)		0.500		Flow per Person per Day (l/per/day)		0.000			
Foul Sewage per hectare (l/s)		0.000							
Number of Input Hydrographs		0		Number of Storage Structures		1			
Number of Online Controls		1		Number of Time/Area Diagrams		0			
Number of Offline Controls		0		Number of Real Time Controls		0			
Synthetic Rainfall Details									
Rainfall Model		FSR		Ratio R		0.360			
Region England and Wales		Cv (Summer)		0.750					
M5-60 (mm)		18.000		Cv (Winter)		0.840			
Margin for Flood Risk Warning (mm)						300.0			
Analysis Timestep		2.5 Second Increment (Extended)							
DTS Status						OFF			
DVD Status						ON			
Inertia Status						ON			
Profile(s)						Summer and Winter			
Duration(s) (mins)		15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440							
Return Period(s) (years)		200, 500, 1000							
Climate Change (%)		0, 0, 0							
PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	
S1.000	S1	15 Winter	1000	+0%					
S1.001	S2	15 Winter	1000	+0%	1000/15 Summer				
S1.002	S3	15 Winter	1000	+0%	200/15 Summer				
S2.000	S4	15 Winter	1000	+0%					
S2.001	S5	15 Winter	1000	+0%					
S1.003	S6	15 Winter	1000	+0%	200/15 Summer				
S3.000	S-TANK	180 Winter	1000	+0%	200/60 Winter				
S1.004	S7	180 Winter	1000	+0%	200/15 Summer				
PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap. (l/s)	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S1.000	S1	64.072	-0.153	0.000	0.22			10.7	OK
S1.001	S2	63.912	0.137	0.000	0.79			38.9	SURCHARGED
S1.002	S3	63.657	0.282	0.000	1.07			51.5	SURCHARGED
S2.000	S4	64.072	-0.153	0.000	0.22			11.0	OK
©1982-2020 Innovyze									

Exceedance Flow Route Plan



LEGEND

- EXISTING MAJOR CONTOUR (0.5m INTERVAL)
 - - - - - EXISTING MINOR CONTOUR (0.1m INTERVAL)
 ————— PROPOSED MAJOR CONTOUR (0.5m INTERVAL)
 - - - - - PROPOSED MINOR CONTOUR (0.1m INTERVAL)
 ————— PROPOSED RETAINING STRUCTURE

GENERAL NOTES

DO NOT SCALE FROM THIS DRAWING WORK TO FIGURED DIMENSIONS ONLY.

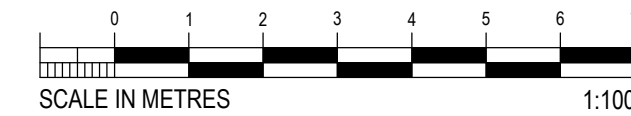
NO DEVIATION FROM THE DETAILS SHOWN ON THIS DRAWING IS ALLOWED WITHOUT PRIOR PERMISSION IN WRITING.

ALL DRAWINGS ARE TO BE READ IN CONJUNCTION WITH ALL ARCHITECTS,
ENGINEERS AND SPECIALISTS DRAWINGS AND THE SPECIFICATION.

THE CONTRACTOR SHALL INCORPORATE ALL THE REQUIREMENTS OF THE PRE-TENDER STAGE HEALTH AND SAFETY PLAN.

THE PROPOSED GROUND LEVELS IN THIS AREA ARE **NOT** DDA COMPLIANT IN ACCORDANCE WITH BUILDING REGULATIONS APPROVED DOCUMENT M.

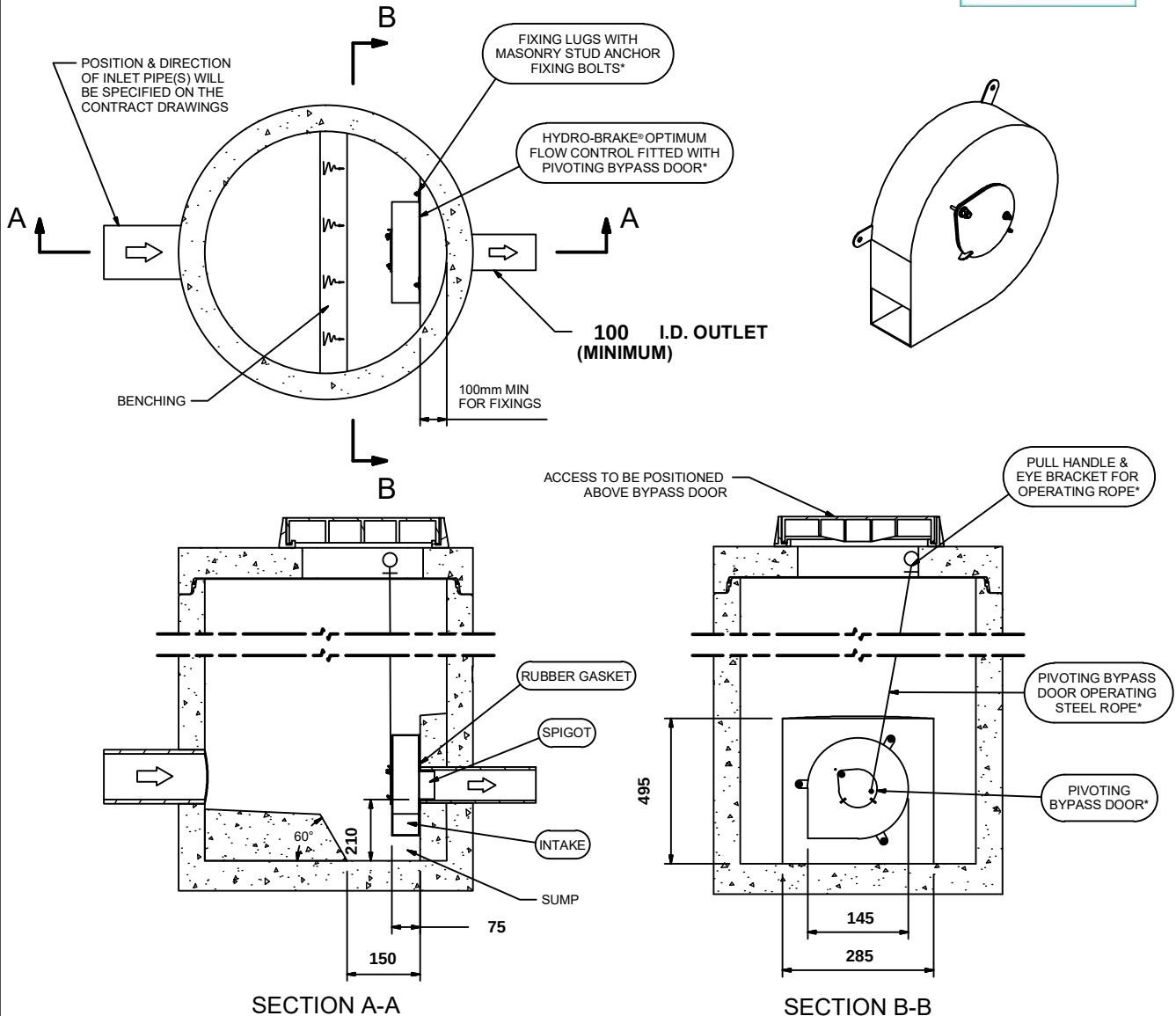
LEVELS TO BE LOCALLY ADJUSTED TO SUIT
TIE-IN WITH EXISTING GROUND LEVELS



Hydrobrake Characteristics & Specification

Technical Specification		
Control Point	Head (m)	Flow (l/s)
Primary Design	1.000	5.000
Flush-Flo™	0.092	1.790
Kick-Flo®	0.104	1.780
Mean Flow		3.399

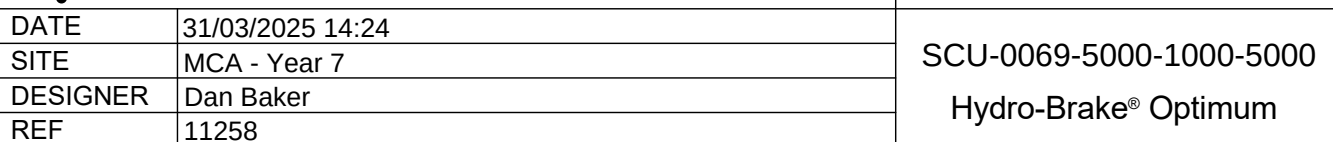
- 3 mm grade 304L stainless steel
- Integral stainless steel pivoting by-pass door allowing clear line of sight through to outlet, c/w stainless steel operating rope
- Beed blasted finish to maximise corrosion resistance
- Stainless steel fixings
- Rubber gasket to seal outlet
- Indicative Weight: 5 kg



THIS DESIGN LAYOUT IS FOR ILLUSTRATIVE PURPOSES ONLY. NOT TO SCALE.

The head/flow characteristics of this SCU-0069-5000-1000-5000 Hydro-Brake® Optimum Flow Control are unique. Dynamic hydraulic modelling evaluates the full head/flow characteristic curve.

The use of any other flow control will invalidate any design based on this data and could constitute a flood risk.

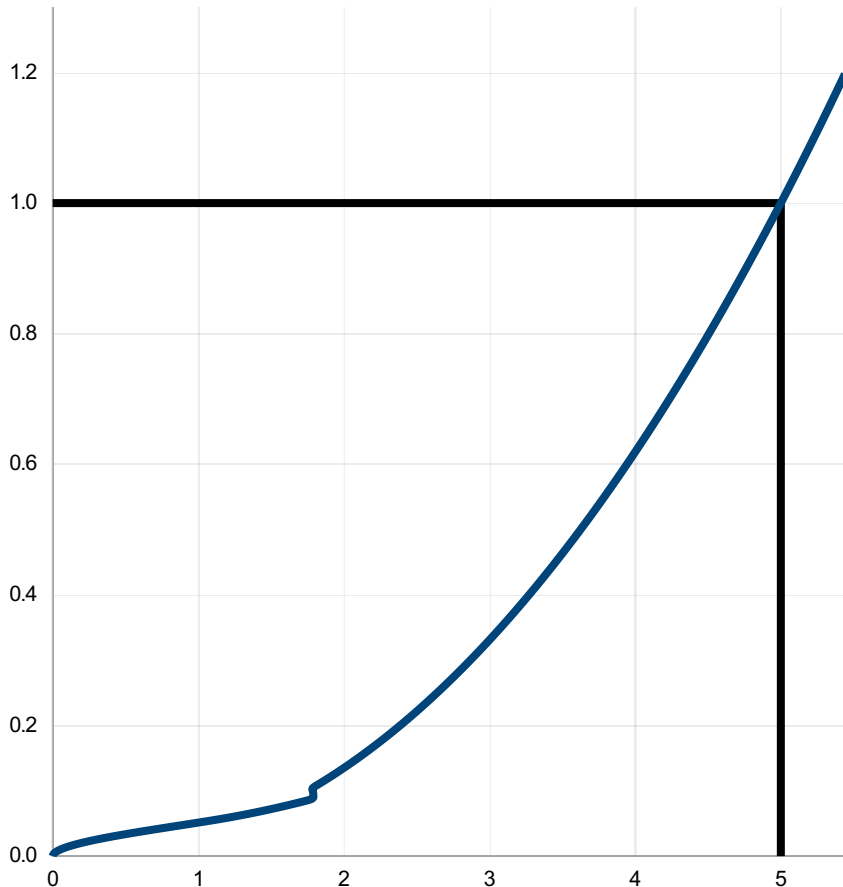


Technical Specification

Control Point	Head (m)	Flow (l/s)
Primary Design	1.000	5.000
Flush-Flo™	0.092	1.790
Kick-Flo®	0.104	1.780
Mean Flow		3.399



hydro-int.com/patents



Head (m)	Flow (l/s)
0.000	0.000
0.034	0.523
0.069	1.436
0.103	1.781
0.138	2.019
0.172	2.231
0.207	2.422
0.241	2.598
0.276	2.760
0.310	2.912
0.345	3.056
0.379	3.192
0.414	3.322
0.448	3.447
0.483	3.566
0.517	3.682
0.552	3.793
0.586	3.901
0.621	4.005
0.655	4.107
0.690	4.206
0.724	4.302
0.759	4.396
0.793	4.488
0.828	4.578
0.862	4.665
0.897	4.751
0.931	4.836
0.966	4.919
1.000	5.000

DESIGN ADVICE



The head/flow characteristics of this SCU-0069-5000-1000-5000 Hydro-Brake® Optimum Flow Control are unique. Dynamic hydraulic modelling evaluates the full head/flow characteristic curve.

The use of any other flow control will invalidate any design based on this data and could constitute a flood risk.

Hydro
International
A CRH COMPANY

DATE 31/03/2025 14:24

Site MCA - Year 7

DESIGNER Dan Baker

Ref 11258

SCU-0069-5000-1000-5000

Hydro-Brake® Optimum